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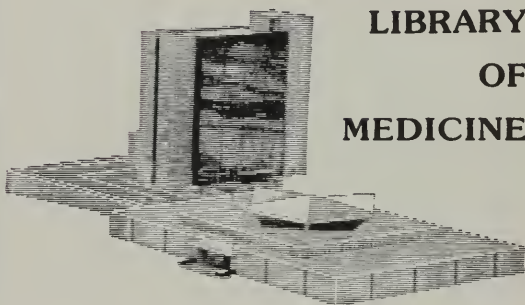
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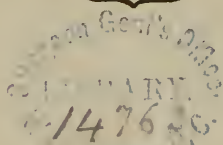
WALTER COLES, M.D.

OF

OF

PARKERSBURG.

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ANÆSTHETICS.

BY WALTER COLES, M.D., OF PARKERSBURG.

A quarter of a century has now elapsed since the light of a new era broke upon medical science, in the discovery of a simple method of abolishing the pain connected with surgical operations and other causes incident to suffering humanity. It is to be regretted, however, that the dawn of anæsthesia was "sullied by a squabble," and that the prejudices and acrimony, growing out of this discovery, have clung to it ever since, and tended in no small degree, to retard its full appreciation, not only by the public, but by an educated profession. What with wrangles over the question of priority of discovery and the still more bitter disputations between the special advocates of different anæsthetic agents and their mode of administration, the interests of science have suffered. Such is the partisan character of much of the current literature of this subject and the singularly opposite views adduced by writers of equally enlarged experience, that it is difficult, if not impossible, for the conscientious enquirer after truth to arrive at a positive and practical conclusion.

Beclouded as is the history of anæsthesia, we have no less cause to congratulate ourselves upon the possession of this incomparable boon than upon the progress—despite of difficulties—we have made in its practical application. The sun of each recurring day for the past twenty-five years, has shed some new ray of light upon the subject and dispelled much of the mist and fog that has hitherto obscured our vision, so that we can look back and gather much that is essential for us to know; for unfortunately in our triumph over pain, we are confronted with the sad fact that we have not as yet overcome the dangers incident to anæsthesia.

Anæsthetics are all, *ex necessitate*, powerful agents and carry the patient, as has been said by Dr. Sansom, to the very "confines of death;" despite of all the caution that science has devised, this fatal line, which separates life from death, has been and continues to be crossed. It does not become the advocates of anæsthesia to ridicule the imputation of danger to any of their *hobbies*, for they have probably all had their victims, and the great practical question is how to avoid the mortal accidents that cast a shadow over the crowning medical discovery of the nineteenth century. Evidently this cannot be accomplished by undertaking to conceal unfortunate cases, or by suppressing any circumstances connected therewith; but they should always be given to the public fully and frankly, as the only means whereby such conclusions can be reached, as will enable the profession at large to form correct opinions upon this important subject. In the following *resume* we hope to develop some of the practical

lessons which the experience of a quarter century has evolved in the anæsthetic world.

NITROUS OXIDE, commonly known as *laughing gas*, is the oldest and probably safest of all our anæsthetic agents. It possesses asphyxiating properties, and is sudden and alarming in its effects, the patient presenting symptoms similar to those of poisoning by carbonic acid. Its precise mode of action is yet a matter of dispute. Marcet believes its physiological action on the human system due, "first, to an increased supply of oxygen to the blood, causing the well known early exhilarating effects, and later, when a large quantity of the gas has been absorbed, anæsthesia is produced by the excessive formation of carbonic acid in the blood, owing to a large supply of oxygen;" whilst the sudden awakening, on withdrawing the mouth-piece, is due to the rapid escape of carbonic acid from the system. No one who has witnessed the action of laughing gas and observed the blueness of the skin and death-like aspect of the subject under its influence, can fail to be impressed with a sense of its potency and satisfied that its action cannot be sustained more than a few moments without danger. The universal verdict of the profession is, that it is only suitable for brief operations, such as the extraction of teeth, opening of abscesses, &c. When properly administered for such purposes in its pure state, it has met with an unparalleled success, there being on record but few instances of death from its use, perhaps not to exceed one in from 75-100,000 administrations. It is, however, often impure, difficult to procure, is expensive, and its mode of administration necessarily cumbersome. For these and other reasons, it is not adapted to general surgical practice, or long operations.

BICHLORIDE OF METHYLENE, introduced by Professor Richardson, of London, in 1867, seems to have attracted much more favorable notice than its allied compound, the bichloride of carbon. The following is a summary, by Prof. R., of its chief characteristics:

1. It is an effective general anæsthetic, producing as deep insensibility as chloroform.

2. In action it is rather more rapid than chloroform, but to develop effects, more of it is required, in the proportion of six to four.

3. It produces a less prolonged second degree of narcotism than other anæsthetics.

4. When its effects are fully developed, the narcotism is very prolonged, and is reproduced with great ease.

5. Its influence on the nervous centres is uniform, and it creates little if any disturbance, or break of action between respiratory and circulatory functions.

6. Its final escape from the organism is rapid, so that the symptoms of recovery are sudden.

7. In some cases it produces vomiting.

8. When it kills, it destroys by equally paralyzing the respiratory and circulatory mechanisms.

9. It interferes less with the muscular irritability than perhaps any other anæsthetic.

10. It combines with ether and chloroform in all proportions.

Since the introduction of the bichloride of methylene, it has been quite largely employed in England, and in many severe and prolonged operations, such as ovariectomy, vesico-vaginal fistula, and the like. So far it

has answered a most excellent purpose, though as we shall presently see, it is not free from the dangers that have cast a shadow over the history of all known anæsthetics. It seems to have been administered altogether by means of an inhaling apparatus. In the first few cases in which Dr. Richardson tested it, he used in all except one, (where Weiss' inhaler was employed), "a simple mouth-piece made of parchment paper stretched over a light frame of wood, and lined on the inner surface with lint." Some surgeons have adopted a plan of subjecting their patients to a concentrated vapor, thus securing the anæsthetic influence with prompt if not hazardous rapidity. Dr. Rendle, in a paper read before the surgical section of the British Medical Association, reports 123 cases, varying in age from six months to seventy years, in which, by an inhaler of his own, he induced insensibility in from twenty to sixty seconds. In these cases vomiting occurred in the proportion of 1 to 8; whereas, when given slowly, it occurred in 1 to 5. Mr. Miall, Surgeon to the Bradford Infirmary, gives an analysis of 100 operations performed under methylene. He uses Marshall's apparatus. The minimum quantity required, was less than a drachm (with some of the female cases); maximum, $3\frac{1}{2}$ drachms. The average time to produce complete anæsthesia was with *men*, 3 minutes and 20 seconds with methylene, to 6 minutes 20 seconds with chloroform; *women*, 2 minutes 22 seconds with methylene, to 4 minutes 18 seconds with chloroform; *children*, 1 minute 16 seconds with methylene, to 2 minutes 24 seconds with chloroform. The quantity of methylene required is about half that of chloroform.* Patients often recover and walk away in three minutes from the commencement of inhalation. Vomiting occurred in 42 out of 97 cases. The pulse was unaltered in 4 cases, quickened in 9, lessened in frequency in 23. In short, Mr. Miall considers methylene safe, and decidedly preferable to chloroform in short operations, whilst for longer ones quite as useful. In administering this agent he deems it important to exclude air, rather than admit it, hence the apparatus should be well applied to the face.

But whilst conceding the virtues of bichloride of methylene as an anæsthetic, the question arises as to its safety, especially its relative safety, as compared with other agents of its class. At present this point cannot be fairly settled. So far it has stood the test fully, as well in general surgery as chloroform and it may be that by the time its physiological effects and mode of administration shall have been studied with the attention that has been bestowed upon that agent, we may arrive at practical deductions of great value. Methylene has been little used in this country. Up to this time, two deaths are chargeable to it. One at Charing Cross Hospital, (Brit. Med. Journal, Oct., 1869), in the person of a man, æt. 39. The other at Guy's Hospital, (Brit. Med. Journal, May, 1870), in a stout man, æt. 40. In addition to this several operators have alluded to "disagreeable symptoms," during its administration. Two such cases are referred to in the British Medical Journal, September, 1869. From the foregoing it would seem that whilst bichloride of methylene is not devoid of danger, it is nevertheless worthy of the studious attention of the profession. We cannot look upon the dark side of the picture, without also recognizing the bright, and acknowledging that in the discovery of this agent, surgery has been greatly benefitted.

* This statement differs widely from that of Dr. Richardson, previously given.

ETHER has been employed very successfully as an anæsthetic since 1846. The difficulties attending the use of this drug in general practice are too familiar to require detailed rehearsal; it is well known to be acrid and disagreeable, producing intoxication, with a long period of excitement, attended with more or less convulsion. The quantity required to maintain insensibility being much larger than chloroform. These and other inconveniencies, hitherto attending the use of ether, have rendered it unpleasant with the profession, causing it to be supplanted, in a great measure, by more powerful and speedy, and less disagreeable and bulky agents. These drawbacks have, however, of late years been considerably modified; by a suitable apparatus properly handled, the excitement is avoided, and the quantity required is much less than under the old method of administration by a towel or sponge. A very simple and excellent inhaler, securing these advantages, has been introduced by Dr. Lente, of New York, also by Dr. Squibb, of Brooklyn.

The necrology of ether seems to have been loosely kept, so much so, that it is difficult to approximate, with any degree of certainty, as to the per centage of deaths occurring under its use. Certain it is, however, that fatal accidents have occurred, even where the purity of the article, the skill of the administration, and the health of the subject seemed beyond question. Some few deaths have been reported in this country, and how many still remain veiled in secrecy, it is hard to say. Within the past year a death from ether has occurred in the land of its nativity, and in the hands of its friends, the case being reported in the Boston Medical and Surgical Journal, December 8, 1870. Some years ago M. Trousseau reported 19 deaths, and other authors have collected a number of cases. In the discussion upon the report of the Chloroform Committee to the Royal Medico-Chirurgical Society, in 1864, (where a number of reckless assertions seem to have been made both *pro and con*), Dr. Kidd is reported to have remarked that "41 deaths from ether had been published in America," (London Lancet—re-print—p. 509, 1864), but this is doubtless a misprint. The most reliable information yet offered to the public on this subject, is by Prof. Andrews, whose statistics, published in the Chicago Medical Examiner, are of great value. He gives the mortality from ether in 92,815 carefully recorded administrations, at one to every 23,204. We defer what further remarks we have to make upon the subject of ether, until we have examined chloroform.

CHLOROFORM—Since 1847, when Dr. Simpson, of Edinburgh, first introduced chloroform, it has grown into rapid popularity, and is now, with the exception of a few circumscribed localities, the almost universal anæsthetic for ordinary surgical operations. It is a familiar household word in every section of the civilized globe, and eagerly sought for by nearly every man or woman, who has to undergo the tortures of the surgeon's knife, or the agony of child-birth.

As to the physiological action of chloroform, whether it exerts its power by a *catalytic* or by a "*physico-chemical*" influence primarily upon the blood, or nervous system, or both, whereby the correlation of certain vital functions are suspended or abolished, we will not tarry to enquire, especially as this matter has been ably discussed in the various works devoted to the subject. These are points worthy of the closest study, but in the present paper we propose to examine into a few of the more prac-

tical facts connected with the questions of safety and danger of this agent.

Necrology of Chloroform. In their report to the Royal Medico-Chirurgical Society, the Committee on Chloroform gives an account of 109 authentic cases of death from this drug, occurring between the years 1848 and 1864. As this includes the total number of reported cases from all available sources, up to that time, we shall accept the committee's report as the basis of our analysis of the history of chloroform during the sixteen years prior to 1864. Of the 109 deaths reported by the committee, 72 were males and 37 were females. They report *no* death under the age of *five* years, and only *two* over *sixty*.

STAGE OF ADMINISTRATION.

Before full effect of chloroform, in	50 cases.
During " " " "	52 "
Not stated	7 "

We have collected 99 deaths, fairly chargeable to chloroform, occurring during the seven years that have elapsed since the report of the committee of the Royal Society.

In 54, where the age is given, we find it as follows:

Under 5 years	2
5 to 10 "	3
10 to 15 "	5
15 to 20 "	6
20 to 30 "	14
30 to 50 "	21
50 to 70 "	3
Total,	54

In 82 there were 56 males and 26 females.

The following table indicates the result of 40 *post mortems*:

Fatty heart	in 6 cases.
Diseased heart	in 4 cases.
Heart and liver fatty and tubercles on brain	in 1 case.
Heart fatty and enlarged	in 1 case.
Fatty heart and ruptured spleen	in 1 case.
Dilated heart	in 1 case.
Atheromatous valves	in 1 case.
Fibrinous clots in heart	in 2 cases.
Cardiac vegetations	in 1 case.
Diseased heart and kidneys	in 1 case.
Engorgement of heart and lungs	in 1 case.
Right heart engorged, spleen and kidneys enlarged	in 1 case.
Congestion of brain	in 2 cases.
Emphysema of lungs	in 1 case.
Nothing abnormal	15 cases.

In 80 cases where the nature of the operation is reported, 60 occurred in minor and 20 in so-called capital operations.

STAGE OF ADMINISTRATION.		STAGE OF OPERATION.	
Early	24	Before	31
Fully under	20	During	22
After removal	12	After completion	16
	<hr/> 56		<hr/> 69

MODE OF DEATH (*as reported.*)

Syncope	48
Convulsions and Syncope	2
Asphyxia	9
Congestion of brain and lungs	1
Tonic contraction of heart	2
"Exhaustion"	1
Convulsions	1
"Necroæmia"	2

66

It is only necessary to glance at the foregoing table, or to read the details of many of the reported deaths from chloroform, to be convinced that the mode of its production is often complex in its nature. We are, therefore, not surprised at the variety of opinions concerning it, that have been advanced by the numerous writers on the subject. For practical purposes we believe Dr. Ellis' theory of death is the most comprehensive; he recognizes *three* sources of danger from chloroform: 1st. Its influence over the heart. 2d. Its effects on the function of respiration. 3d. Its action as a narcotic poison producing coma. This classification seems to cover pretty much the whole ground, if we exclude that class of cases (to which we will again refer further on) claimed to be due to the shock imparted to the peripheral nerves by the operation itself, and which are not fairly chargeable to the chloroform. Under the *first* head may be placed that major class of cases referred to *syncope* by Sansom, and embracing: *a*, sudden or gradual perturbations in the function of nerves supplying the heart, whether due to "*shock*" or secondary causes; *b*, failure of heart due to structural changes; *c*, failure of heart through direct action of altered blood in coronary arteries on the organ itself. Under the *second* head, which answers to the "*asphyxia*" of other writers, we would embrace many cases due to sudden paralysis of the *par vagum*, wherein respiration and circulation cease simultaneously. Death may be induced by any single one of the causes enumerated, or it may be the result of one or more combined; the history of many cases, as well as the *autopsies* indicate that this is the case.

The 99 deaths that we have collected do not cover the whole number of reported accidents by chloroform during seven years. We have rigidly excluded all doubtful cases, as well as a number dying from *self-administration*; but even excluding this latter class, (who are nearly always in the *habit* of thus inhaling it), we still have 14 deaths among persons who had previously taken chloroform with impunity. In one of these cases the woman had frequently used chloroform in her labors, whilst others are reported as having been anæsthetized "*many times*" previously to the fatal catastrophe. It is especially worthy of note, that three of the

individuals dying of secondary inhalation, had fatty hearts; two dying under the second chloroformization, and one in the third. In one of these, chloroform had been used a month prior to the fatal accident, thus showing that even fatty heart is not necessarily productive of evil under this agent. In another case the patient, (who died of syncope), was subject to "*fainting spells*."*

If we add the 99 deaths reported by us, to the 109 collected by the committee of the Royal Society, we have a total of 208 authentic deaths from chloroform, since the period of its introduction as an anæsthetic. Whilst this does not include anything like all the fatal cases, it is nevertheless a formidable array, and in their analysis we are taught many lessons of practical value; they indicate that no age or sex is exempt—and since fully one-third present no *post mortem* lesions—that no condition of health can be relied on as a guarantee of safety. But as they demonstrate many of the causes of death, we are enabled, in some measure, to avoid accidents by observing closely those conditions of the system unfavorable to chloroform. The following are some of the more important matters to be taken into consideration as precautionary measures: *Purity of the drug and mode of administration*—On these points, especially the latter, we have "confusion worse confounded;" some insisting that the purity of the chloroform is a *sine qua non*, and referring many of the accidents to a neglect of this precaution, whilst others declare that everything turns upon the mode of administration. Se'dillot asserts that "chloroform, when pure and well administered, never kills." Syme believes that "any case for operation, was a case for chloroform," whilst Dr. Anstie declares that with "proper care," chloroform may be fearlessly given to "any patient, who is fit to undergo any operation at all, whether there be any existing disease of heart, lungs, or brain, or not." Indeed, it may be said, that the vast majority of prominent writers upon chloroform, maintain that by a judicious selection of subjects and careful administration, it may be robbed of nearly all its danger. Acting upon this principle, and also upon the acknowledged fact that atmospheres containing more than from 3 to 4½ per cent of the anæsthetic, are dangerous. Numerous mechanical contrivances have been introduced for the graduation of inhalation. On the other hand no less authority than Dr. B. W. Richardson, says: "In reviewing the past of chloroform as an anæsthetic, from its introduction until now, I see nothing to lead me to assume that any of the deaths which have followed the administration have been due either to absence of skill on the part of administrators, want of special knowledge respecting special apparatus, or absence of special mixtures of chloroform with other fluids. I see nothing again in bad quality of specimens of chloroform, to account for the fatality which has attended its use. Lastly, I see nothing in operative surgery, (except that there *seem* to have been more deaths from the vapor, when it was used for minor than for major operations), to account for the fatality. All through the chapter, one administrator appears to have been as skillful and as thoughtful as another, one quality of chloroform as good as another, one operator as careful as another. I can find no single death from chloroform in which even a pretext of a charge could be raised against these

* Although but a single case, this militates against the view expressed in the work of M. M. Perrin and Lallemand, that a **PREDISPOSITION** to syncope is no bar to chloroform. (*Traité d'Anesthésie Chirurgicale*, p. 429).

factors in the catastrophe. We must, therefore, look for the cause of death in some inherent fault in chloroform itself, which unfits it for every person indiscriminately; or, putting it the other way, in some inherent fault in the organisms of certain who die, which renders them unfitted to meet the physiological changes the chloroform excites when it is introduced into the organism."

If Dr. Richardson means by the concluding sentence that there is an idiosyncrasy in certain individuals, which is inimical to chloroform, he announces a proposition that must be necessarily limited in its application, or else what becomes of this "inherent fault of the organism" of those who inhale chloroform two, three or half dozen times, and finally die in the second, third, or seventh inhalation? The doctrine of idiosyncrasy may apply in some rare instances, but its application seems to us exceptional. Dr. R.'s first proposition, that there is "an inherent fault in chloroform itself, which unfits it for every person indiscriminately," is borne out by accumulating testimony, but when he "puts it the other way," he runs counter to an array of facts, which it is difficult to get over. For, on the contrary, the degree of impressibility of individuals to chloroform seems to vary at different times and under different circumstances. This varying susceptibility of persons at different times according to the particular state of the nervous system, is a matter of every day observation; for example, a dose of tartar emetic, which will vomit at one time, may have no effect at another; a person may witness a surgical operation unmoved on one occasion, and yet faint away when the spectacle is repeated; so, too, chloroform may be inhaled with impunity on one day, whilst it induces fatal syncope at another. We believe that the question of life or death in all cases, (free from organic complications and where due care is observed), turns upon the particular condition, or susceptibility, which happens to be present in the individual at the time of inhalation; in each instance, the risk is *permanent* as to the chloroform, whilst it *fluctuates* in the subject.

On theoretical grounds, an apparatus for regulating the strength of chloroform vapor, commends itself to our favorable consideration, but as Perrin remarks of inhalers, "the immunity promised in their name remains thus far a Utopæan idea." In England their name is legion, but yet the mortality by chloroform has rather increased than diminished, and every now and then we hear of a death, when this, that or the other inhaler has been employed. A large number of the leading surgeons of the world, and among them the warmest advocates of chloroform, have rejected inhalers. In an autograph letter Dr. Andrews tells me that "inhalers are not generally used in England, except Clowes's apparatus, which is frequently employed in London hospitals." From this fact I infer those who have had the best opportunities of testing inhalers, have failed to discover in them the many advantages claimed by their inventors. In this country, where the mortality from chloroform is certainly as small as abroad, we scarcely ever hear of inhalers except in books. The records of chloroform in the surgery of all modern wars will compare favorably with the average civil hospital practice, which is an additional illustration of the fact that the dangers are not sensibly lessened by apparatus.

The sources of danger, susceptible of ^{recognized} pernicious recognition in the subject are: 1st. Intemperance and its concomitants; 2d. Fatty degeneration of heart; 3d. Dilated heart; 4th. Septicæmia 5th. Collapse;

6th. Profuse hemorrhage; 7. Hysteria; 8th. Strong emotional disturbance; 9th. Predisposition to syncope; 10th. Obesity, especially in aged persons; 11th. Extensive disease of lungs; 12th. Emphysema. Most of the foregoing conditions are so generally recognized, that we will not comment upon them at length, but merely add that experience goes to prove that weakly persons are the best for chloroform, which is contrary to popular belief. Sansom does not consider valvular disease of the heart a bar to its use. In regard to lung troubles, this author remarks. "If a patient is suffering from chronic disease of the lung, whether consumption or emphysema, or bronchitis, (provided there is no evidence of recent congestion), there is no special danger in the administration of chloroform. But if there is general congestion, or acute hyperæmia of the lung, chloroform should be withheld." It will be observed that in the list of autopsies we have presented, there was one case of emphysema of the lungs. Although so high authority as Dr. Sansom regards emphysema as no bar to chloroform, we would be disposed, *a priori*, to regard it as a just cause for fear; for in emphysema the *residuum* of air is always much greater than in the healthy lung, and when this remaining air becomes charged with anæsthetic vapor, it is impossible to regulate its effects.

But whilst the facts and figures we have given, imperfect as they are, serve a valuable purpose, in connection with the prophylaxis of chloroform accidents, they fail to convey an estimate of the *per centage of mortality*, which is, after all, the practical point at issue. It will be observed from the statistics which we have collected, that the number of deaths from chloroform during the past seven years is nearly as great as in the sixteen years intervening from 1848 to 1864.* Deaths from chloroform seem far more common than formerly; for example, in England during the five years from 1852-'56 inclusive, there were recorded in tables of the Registrar General, 13 deaths from chloroform. In another period of six years, from 1863-'68 inclusive, there were recorded 57 deaths from the same cause. In the single year of 1869 there were ten deaths in England attributable to chloroform. In his Medical History of England, written in the years 1864-5, Dr. Richardson put the mortality from chloroform, in eight large hospitals, at one death in 17,000 administrations. But since that, from 1864 to 1869, there have been in these same hospitals 6 deaths in 7,500 administrations, or one in every 1,250 cases. In six other hospitals, Dr. Richardson has found 3 deaths to 7,900 administrations, or one in 2,633 cases. We thus have a total of 35,162 administrations of chloroform with 11 deaths, or one in every 3,197.

More valuable than the above, because on a larger scale, are the elaborate researches of Dr. Edmund Andrews, of Chicago, this gentleman took the trouble to investigate personally the records of chloroform anæsthesia in many of the largest hospitals in this country and in Europe, and was enabled in this way to form a correct estimate of the ratio of deaths. Out of 117,087 chloroformizations, Prof. Andrews found 43 deaths, or one in every 2,723. By combining the statistics of Drs. Andrews and Richardson, we have the following bird's eye view of the absolute and relative mortality of the several anæsthetics treated of in this paper in a given number of carefully recorded administrations:

* Probably much greater, if we include the statistics of the Franco-Prussian war.

Ether,	4 deaths to 92,815 inhalations, =1 to 23,284
Chloroform,	53 deaths to 152,260 inhalations, =1 to 2,373
Mixed chloroform and ether, 2 deaths in 11,176 inhalations, =1 to 5,588	
Bichloride methylene,	2 deaths in 10,000 inhalations, =1 to 5,000

The above figures are the most valuable and reliable that have ever been published in reference to the mortality in anæsthesia. They are, perhaps, under rather than over the mark, and demonstrate a state of facts so absolutely at variance with the received opinions five years ago, as to become perfectly startling. They indicate that chloroform is eight times more dangerous than ether; that it is twice as dangerous as an equal mixture of chloroform and ether, and that, as far as experience goes, it is more fatal than bichloride of methylene.

In view of the above facts, the question arises, "*Will chloroform maintain its present popularity as an anæsthetic in surgery?*" We do not believe it will. Unless some method, other than we have at present, is devised to lessen the risk attendant upon its use, we can but think that its popularity must decline. In the face of such figures as we have adduced, chloroform cannot and ought not to supercede ether in hospital practice. The inconveniences attending the use of ether, are more than compensated for in the risk of chloroform. We do not believe that a surgeon is justified in selecting chloroform in preference to ether, when the option lies between the two; if he does so, he acts with his eyes open, and he assumes a weighty responsibility.

An attempt has been made by the advocates of chloroform to attribute many of the fatal accidents to a state of syncope, induced by terror, or to shock imparted by the surgeon's knife to the peripheral nerves. That sudden deaths have occurred prior to, and during operations, when no anæsthetic was employed, though purely nervous perturbation has been vouched for in numerous instances by the highest authority, but this fact tends in no way to modify the status of chloroform in reference to the question of danger, for the same remarks apply equally to other agents; and even granting that this explanation of certain of the deaths were true, it appears from what we have seen, that such accidents are eight-fold more frequent with chloroform than with ether, which is certainly a strong argument in favor of the latter.

Anæsthesia in Midwifery.—As the foregoing remarks have exclusive reference to surgery, we would be guilty of an unpardonable sin were we to drop the subject without a brief notice of the use of anæsthetics in mitigating the pains of labor; for, when we enter this field, the whole aspect of the question is changed; hence it is deserving of a separate and distinct notice.

Chloroform is, *par excellence*, the anæsthetic in midwifery. The excitement induced by ether, and the quantity necessary to be employed, unfits it for the wants of the accoucheur. Ether may be the more readily discarded, too, for the reason that the well-founded objections to chloroform in surgery do not obtain in obstetrics. As respects the mere question of *danger*, it may be confidently asserted that chloroform, properly administered, is almost devoid of risk in labor. The experience of the whole world, for a quarter of a century, goes to prove that the objections to chloroform in midwifery—if such there are—must be found outside of its direct effect upon parturition itself. The same process of reasoning which compels us to condemn this agent in surgery, vindicates its safety in ob-

stetries; if we accept one proposition we cannot exclude the other. Prof. E. S. Dunster, of New York, who, as editor of one of the leading medical journals in this country, is entitled to speak with authority, says, in an autograph letter, "I do not know a single authentic case of death where chloroform has been used to mitigate the pains of labor, and it is in this condition that I make my *only* exception as to its use, and you know I preach pretty strongly against it." Dr. Andrews tells us, in a letter, "My statistics contain no obstetric cases. I never knew of a death from chloroform in midwifery." Dr. Squibb, of Brooklyn, who has paid much attention to this subject, remarks, in a valuable paper on "*Anæsthetics*," read before the New York State Medical Society, "The writer has neither read of nor heard of a single instance of death, or grave symptoms, from the use of chloroform when used in obstetrical practice for mitigating the pains of labor, nor of death from its use in controlling puerperal convulsions; but knows of one death where it was given preparatory to the operation of turning, in a case where a midwife had mismanaged and protracted a shoulder presentation." In his treatise on chloroform, Dr. Sansom alludes vaguely to two deaths in "natural labor," under this agent, but he fails to give any particulars, and, in a subsequent chapter, virtually throws them out of consideration by accepting the statement of the committee of the Royal Medico-Chirurgical Society, that "there is no well-authenticated instance of sudden death recorded, either in this country or abroad, as occurring from the administration of anæsthetics during *natural labor*, when such administration has been conducted by a well-qualified medical man." (Sansom on Chloroform, p. 225.)

Hundreds of thousands of women have inhaled chloroform, and found it a blessed relief from the agonies of parturition, and suffered no detriment to mother or child. In nearly all the large cities of the world chloroform is freely resorted to for this purpose by the vast majority of practitioners. Moral objections, as well as dangers of a secondary character, have been urged against the use of anæsthetics in parturition, but, as we have already exceeded the bounds prescribed for this paper, we will merely remark that the former seem absurd, whilst the latter have doubtless been exaggerated, and due rather to the abuse than the use of these agents. In seeking a solution of the fact that parturients are less liable to chloroform accidents than surgical cases, there are several points to be taken into consideration. In the first place, it must be remembered that in natural labor there is no necessity for pressing chloroform to the stage of narcotism; hence, we avoid all the risks incident to the full effect of the drug. Of the three divisions of the nervous system, the *cerebro-spinal* is the first affected by chloroform; then, the *reflex*; lastly, the *ganglionic* nerves. The mechanism and physiology of labor, so little understood by the unprofessional, *belong, almost exclusively, to the two latter classes of nerves*. The idea among the vulgar that the movements of the uterus, which is a mere muscular bag, are subject to the will, and parturition under the control of volition, is as absurd as to suppose that a person can regulate the beating of his heart. Such is the tenacity of vitality in the womb that it has been known to continue its contractions even after the heart had ceased to beat; a dead woman has been known to give birth to a child.

The immediate effect of chloroform is to destroy sensation; to mitigate or annul pain is as far as its effects need be carried in labor; for this is sufficient to rob this function of the mental and physical agony which has

left an indelible impress on thousands of unfortunate women, entailing a train of evils which last throughout a blasted and miserable life. Physiology, as well as experience, teaches us that with the abrogation or mitigation of sensation, the system possesses as ample motor power to effect the expulsion of the child as though the full senses were retained; indeed, more so, for the sense of anguish, and consequent exhaustion, so retarding to efficient labor, are thus kept in abeyance; in other words, chloroform simply eliminates pain and other disturbing elements, and allows nature to perform her work uninterruptedly.

It is clear that since only the early benumbing effects of chloroform are required in parturition, the woman must, of necessity die—if she die at all—by sudden syncope, or “shock,” such as is frequently met with in surgical practice; but, with proper caution, the inhalation being gradual, and the vapor largely diluted, there is scarcely any danger from this source. There seems to be something in the parturient condition which fortifies the nervous system against the paralyzing effects of chloroform. We have already stated that we were incredulous of an inherent chloroformic idiosyncrasy; but held that persons free of organic disease were more liable to death at one time than another, owing to the peculiar condition of the nervous system at the time of administration. In this way we attempted to explain the frequent occurrence of death in persons previously anaesthetized with impunity. This point is further illustrated in the relative immunity of those operated upon for long-standing disease over persons who have been subjected to no such preparatory influence, and whose nervous system is thus *taken by surprise*. In respect to chloroform, *pregnancy* seems to exert a similar effect. From the moment of conception, the eye witnesses marked changes in the whole physical economy of the female, by which she is fitted for the great trial that awaits her; so that, when labor sets in, she is competent to endure an amount of wear and tear that would, otherwise, overwhelm her; her whole nervous organism participates in these changes; she becomes literally “*nerved up*” to her great work, and in this way she is prepared to take chloroform not only with impunity but with advantage. In the list of deaths which we have collected, there is one case strikingly illustrative of this fact; that of a woman, aged thirty-nine, who had frequently taken chloroform in her labors, but who died, suddenly and early, from syncope, when it was given for the extraction of a tooth. It seems to be the peculiar *condition* of the parturient woman which renders her innocuous to chloroform, as though a beneficent Providence had prepared her system to receive with impunity that blessed and welcome relief from suffering which science has so happily provided, and which averts the prostration and nervous shock which has so often converted the high hopes of bright and happy homes into the bitter ashes of despair.

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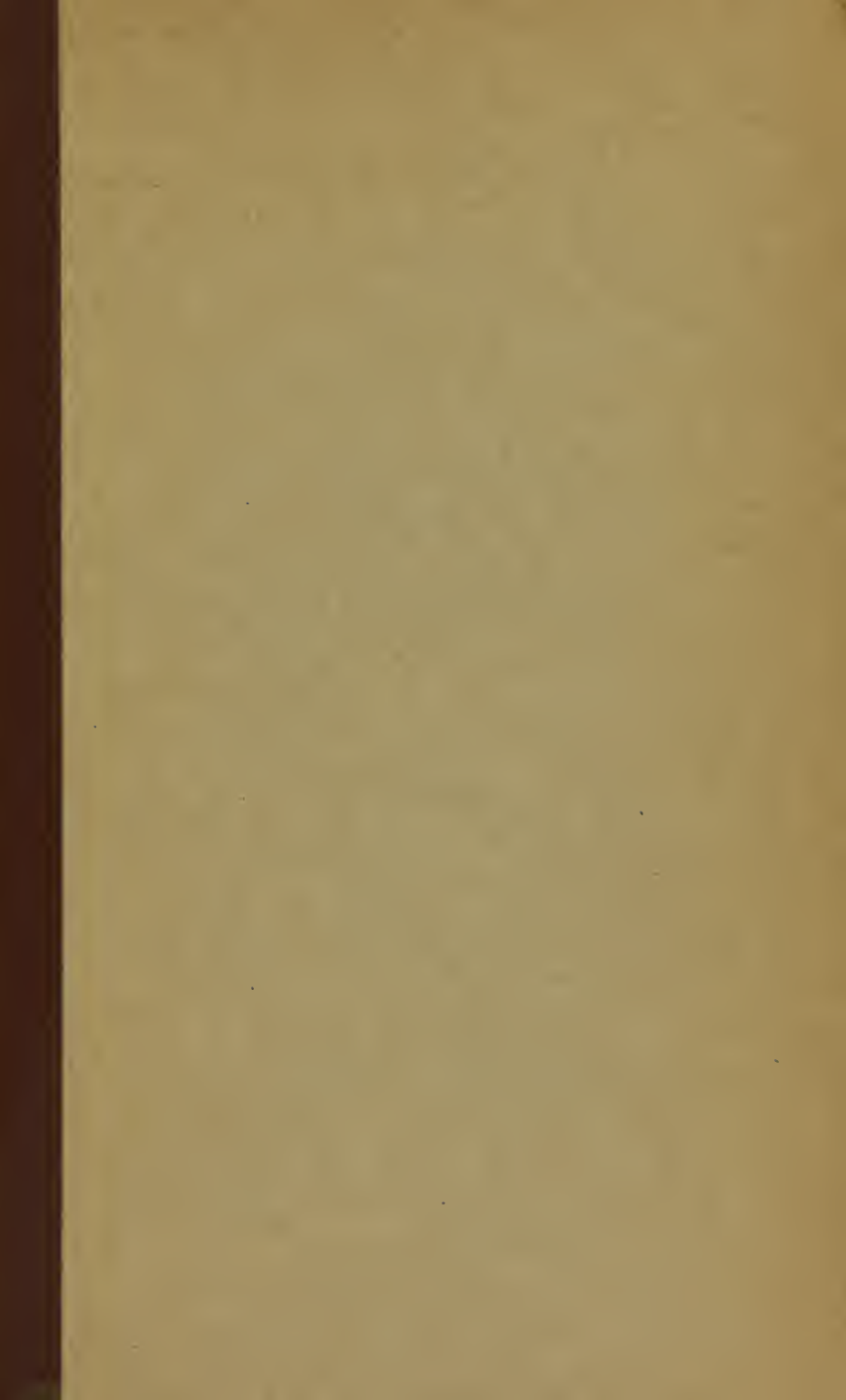
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